

siderably increased. Whenever a large number of caterpillars are supplied to one wasp, however, numerous moths appear so that many caterpillars escape being parasitized

No data were collected on the duration of the different stages of development, but under variable conditions of room-temperature records were taken of times of setting parents and of collecting progeny. Maximum periods for a complete generation thus ranged from 27 to 48 days inclusive with frequencies given in two-day intervals as follows:—44, 59, 126, 151, 143, 100, 88, 48, 20, 20, 15. These numbers show that the generation extends on the average slightly over a month, but may be somewhat shorter, while laggards may extend the time considerably.

THE JURASSIC INSECTS OF TURKESTAN

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In 1920 a very remarkable deposit of fossil insects of Jurassic age was discovered in the vicinity of Galkino, in Turkestan. The locality is within the territory of the so-called Cossack Republic, and is reached by the railway running east from Arys. Many of these insects have already been described by Martynov in *Bull. Acad. Sci., Russia*, ('25), but when I recently visited the Museum of the Academy at Leningrad, I was shown an amazing series of specimens, which when made known will profoundly influence many of our ideas concerning the age and evolution of various insect groups. The publications of Martynov on the Jurassic and Permian fossil insects will certainly be among the most important contributions to entomology in the next decade.

My wife and I had meant to visit the Galkino locality, but when we tried to make the necessary arrangements at Tashkent, so many difficulties presented themselves that it was impracticable to do anything. However, I was kindly permitted to study and describe some of the Galkino specimens in the Middle Asian Museum at Tashkent. Mr. Yankowsky, the director of

the Museum, is a keen entomologist, especially interested in Lepidoptera. The Galkino collections at Tashkent have mostly been collected, and partly studied, by Mrs. N. Y. Besobrasoff, of the Faculty of Physics and Mathematics, Central Asian State University. I am much indebted to her for courtesies in connection with my work. I made notes on seven of the most interesting fossils, but for the present describe only three. Some of the others, as for instance a cockroach with the head extended forward beyond the oval prothorax, not concealed as in modern forms, will probably be described from other specimens by Martynov. A very large Palæontinid, the anterior wings about 38 mm. long, hind wings about 18, is extraordinarily like a cicada, but shows a straight ovipositor, about 5.5 mm. long, projecting from the apex of the abdomen. A dipterous insect is of extremely modern aspect, with two large dark spots on the wings, much as in modern mycetophilidæ.

Hymenoptera.

Martynov described from Galkino a very interesting Tenthredinoid related to the Xyelidæ, which we have long regarded as a primitive group. It actually shows the lanceolate cell (really two cells, of course) contracted below and with an oblique cross vein as in modern forms. The antiquity of this structure is astonishing. In the Museum at Tashkent I found a second species of the same genus, which I propose to call *Anaxyela martynovi*. It is 13 mm. long (excluding ovipositor); black, parallel-sided, stout; width of thorax about 3.3 mm. of abdomen about 3.5 mm; head transverse, thorax oval, abdomen with the sutures rather broadly pallid; ovipositor straight, 4.5 mm. long, about 0.6 mm. broad, sharply pointed but not gradually tapering; wings ample, hyaline, with black veins (venation as shown in fig. 1), stigma small, lanceolate, defined by a slight infuscation above radius; anterior wing about 10.3 mm; radial cell 5 mm. black beyond this creamy white (exactly same on both sides, so evidently natural coloration); length of antennæ about 3.5 mm., or perhaps more. Martynov's *A. gracilis* has the head and body about 9.2 mm., but the ovipositor much longer in proportion, being half the length of head and body.

Neuroptera

An exceedingly large and broad anterior wing may stand as *Besobrasovia* (new genus) *latissima*. I showed my sketch to Dr. Martynov, and he had nothing like it. It is of triangular shape, with rounded apex, 72 mm. long, width across middle about 48 mm., outer margin gently curved, about 58 mm.; costa straight, broad costal field (about 6 mm. broad near base) crossed by slender oblique veins about 1.5 mm. apart, but breaking up along the costa into very numerous fine veins; Sc and R running parallel about 2 mm. apart, and Rs about 2 mm. below R and also parallel with the others, the Rs emitting below eight very

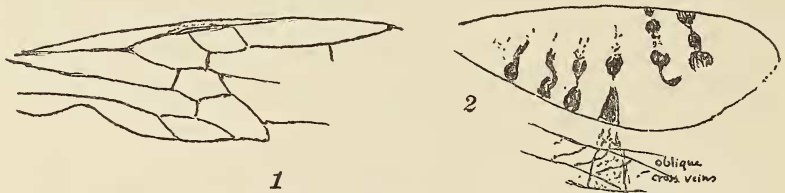


Fig. 1.—*Anaxyela martynovi* sp. nov., wing.

Fig. 2.—*Besobrasovia latissima* gen et sp. nov., wing.

oblique branches before the subapical region, these branches about 6.5 mm. apart at points of origin, but from one to the other, as they run subparallel, is only about 3 mm. In the submarginal region, about 13 mm. from margin, these branches regularly fork, and apically there are very many fine parallel veins. The media has at least three branches below. The cubitus, arising at base of media, forks at about 9 mm. from base of wing, and is further subdivided beyond. The anals are obscure. The specimen bears the numbers 162, 2903. The venation agrees closely with that of *Kalligramma hæckeli* Walther, from Solnhofen, but the apex is much less rounded, and the fine close cross-veins are lacking. There is apparently closer affinity with such species as *Brongniastiella inconditissima* Handl., also from Solnhofen, but it differs from that genus by the fewer oblique nervures below radius, and also in shape. In the Turkestan deposits at Kapadac-may, a genuine *Kalligramma* was found, and this has been described by Mrs. Besobrasoff. It is of great size, the anterior wing about or nearly 50 mm. broad in middle,

and showing well the fine close cross-veins so characteristic of the genus. The hind wing also shows the large ocelliform mark. The ocelli of the hind wings are curiously similar to those of the orthopterous genus *Tanusia* and *Pterochroza*, from Brazil.

Orthoptera

The interesting genus *Absitus* of Martynov consists of long-horned grasshoppers of considerable size, with transversely banded wings. The males are said to have a well-developed musical apparatus. The genus was founded on *A. fasciatus* Martynov but to my astonishment when I called on him, Martynov produced drawings of a whole series of species, all showing the same general type of marking, though with much diversity in details.

However, still another species, not represented in his series, is preserved in the museum at Tashkent. I will call it *Aboilus besobrasovæ*. Figure 2 shows the pattern of the broad tegmen, so far as preserved, and a detail of the venation, with the characteristic oblique cross-veins, in the region of the black cuneiform mark shown just above. The insect is about 52 mm. long, with heavily spotted or banded tegmen which probably had a length of about 70 mm., but the apical part is not visible. The outline is not well shown, and the figure does not pretend to any exactness on this point. The ovipositor, not previously known in the genus, is well preserved, directed obliquely downward, about 18 mm. long and 2.5 mm. wide in middle (lateral view), straight ensiform. Hind tibiæ about 27 mm. long and 1.5 wide in middle, posteriorly with only small spines. Wings (tegmine) pallid, with heavy black markings directed transversely, the largest being long-triangular or wedge-shaped, about 8 mm. long. Width of tegmen at fourth transverse band 22.5 mm., at third band 19.5 mm., at second band 17, and at first band 14 mm. The first dark band is about 12 mm. from base the second about 9 mm. beyond it, the third about 5 mm. beyond that, the fourth about 5.5 mm. further, then the fifth and sixth after shorter intervals. These bands consist of series of broad spots or markings, either separated from one another, or united

by slender isthmi. In an area about 27 mm. long and 8 mm. broad, where the abdomen of the insect was, the marking is absent, though it must have been originally present. The third and fourth bands are especially characteristic, having wedge-shaped marks with their bases on anal margin of wing, and above them, but separated from them, ovate spots, more or less pointed at the ends. The two outer bands consist of a series of large suboval spots united by slender or short bands.

I am much indebted to Mr. Uvarov at the British Museum for calling my attention to similar characters in modern species. Thus the oblique cross-veins are beautifully shown in the genera *Pseudophyllus* and *Cratylus*, which however lack the color markings. The cross-banding and spotting is well seen in other living genera, as in the Cystophyllid *Sanaa imperialis* White from India, which is beautifully shown in colors on one of the post-cards issued by the Museum. Much more like *Aboilus besobrasovæ* in markings is *Typhoptera donovani* Donovan, also from India.

Although it has nothing to do with the fossils, I venture to add a note on the extraordinary features of the South American *Catasparata histrio* Brunner, *Mimetica picteti* Kirby and *Typhophyllum mutilatum* Walker which were shown to me by Uvarov. The tegmina are exactly like dry leaves, in some cases appearing as if spotted by fungi, but the extraordinary thing is that the males (only the males, as Uvarov noted) have on the costal margin a semicircular incision exactly as if cut by a *Megachile* bee. *Megachile* is of course richly represented in the same country. The simulation is perfect, but its biological significance is not so clear.